ARC 0993C

EDUCATIONAL EXAMINERS BOARD[282]

Notice of Intended Action

Twenty-five interested persons, a governmental subdivision, an agency or association of 25 or more persons may demand an oral presentation hereon as provided in Iowa Code section 17A.4(1)*"b."*

Notice is also given to the public that the Administrative Rules Review Committee may, on its own motion or on written request by any individual or group, review this proposed action under section 17A.8(6) at a regular or special meeting where the public or interested persons may be heard.

Pursuant to the authority of Iowa Code section 272.2, the Board of Educational Examiners hereby gives Notice of Intended Action to amend Chapter 13, "Issuance of Teacher Licenses and Endorsements," and Chapter 17, "Career and Technical Endorsements and Licenses," Iowa Administrative Code.

In December 2012, a licensure subcommittee of the Governor's STEM Advisory Council, consisting of science, math, and industrial technology practitioners and administrators as well as higher education, Department of Education, and Board of Educational Examiners representatives met to recommend licensure rules to support implementation of Iowa's Science, Technology, Engineering, and Mathematics (STEM) initiative. The STEM initiative is based on Executive Order 74, signed by Governor Branstad on July 26, 2011. The subcommittee recommended the proposed amendments, which will create K-8 and 5-8 STEM endorsements, a K-12 STEM specialist, a career and technical license for engineering, and a 5-12 engineering endorsement.

Any interested party or persons may present their views either orally or in writing at the public hearing that will be held Wednesday, September 25, 2013, at 1 p.m. in Room 3 Southwest, Third Floor, Grimes State Office Building, East 14th Street and Grand Avenue, Des Moines, Iowa.

At the hearing, persons will be asked to give their names and addresses for the record and to confine their remarks to the subject of the proposed amendments. Persons who wish to make oral presentations at the public hearing may contact the Executive Director, Board of Educational Examiners, Grimes State Office Building, East 14th Street and Grand Avenue, Des Moines, Iowa 50319-0147, or at (515)281-5849, prior to the date of the public hearing.

Any person who intends to attend the public hearing and requires special accommodations for specific needs, such as a sign language interpreter, should contact the office of the Executive Director at (515)281-5849.

Any interested person may make written comments or suggestions on the proposed amendments before 4 p.m. on Friday, September 27, 2013. Written comments and suggestions should be addressed to Kim Cunningham, Board Secretary, Board of Educational Examiners, at the above address, or sent by e-mail to kim.cunningham@iowa.gov, or by fax to (515)281-7669.

These amendments are subject to waiver pursuant to 282—Chapter 6, "Waivers or Variances From Administrative Rules," Iowa Administrative Code.

After analysis and review of this rule making, there is no anticipated impact on jobs.

These amendments are intended to implement Iowa Code section 272.2(1)"a."

The following amendments are proposed.

ITEM 1. Adopt the following **new** subrule 13.28(31):

13.28(31) *Engineering.* 5-12.

a. Completion of 24 semester hours in engineering coursework.

b. Methods and strategies of STEM instruction or methods of teaching science or mathematics.

ITEM 2. Adopt the following **new** subrule 13.28(32):

13.28(32) *STEM.*

a. K-8.

(1) Authorization. The holder of this endorsement is authorized to teach science, mathematics, and integrated STEM courses in kindergarten through grade eight.

(2) Program requirements. Be the holder of the teacher—elementary classroom endorsement.

(3) Content.

1. Completion of a minimum of 12 semester hours of college-level science.

2. Completion of a minimum of 12 semester hours of college-level math (or the completion of Calculus I) to include coursework in computer programming.

3. Completion of a minimum of three semester hours of coursework in content or pedagogy of engineering and technological design that includes engineering design processes or programming logic and problem-solving models and that may be met through either of the following:

- Engineering and technological design courses for education majors;
- Technology or engineering content coursework.

4. Completion of a minimum of 6 semester hours of required coursework in STEM curriculum and methods to include the following essential concepts and skills:

- Comparing and contrasting the nature and goals of each of the STEM disciplines;
- Promoting learning through purposeful, authentic, real-world connections;
- Integration of content and context of each of the STEM disciplines;
- Interdisciplinary/transdisciplinary approaches to teaching (including but not limited to problem-based learning and project-based learning);
- Curriculum and standards mapping;
- Engaging subject-matter experts (including but not limited to colleagues, parents, higher education faculty/students, business partners, and informal education agencies) in STEM experiences in and out of the classroom;
- Assessment of integrative learning approaches;
- Information literacy skills in STEM;
- Processes of science and scientific inquiry;
- Mathematical problem-solving models;
- Communicating to a variety of audiences;
- Classroom management in project-based classrooms;
- Instructional strategies for the inclusive classroom;
- Computational thinking;
- Mathematical and technological modeling.

5. Completion of a STEM field experience of a minimum of 30 contact hours that may be met through the following:

- Completing a STEM research experience;
- Participating in a STEM internship at a STEM business or informal education organization; or
- Leading a STEM extracurricular activity.

b. 5-8.

(1) Authorization. The holder of this endorsement is authorized to teach science, mathematics, and integrated STEM courses in grades five through eight.

(2) Program requirements. Be the holder a 5-12 science, mathematics, or industrial technology endorsement or 5-8 middle school mathematics or science endorsement.

(3) Content.

1. Completion of a minimum of 12 semester hours of college-level science.

2. Completion of a minimum of 12 semester hours of college-level math (or the completion of Calculus I) to include coursework in computer programming.

3. Completion of a minimum of 3 semester hours of coursework in content or pedagogy of engineering and technological design that includes engineering design processes or programming logic and problem-solving models and that may be met through either of the following:

- Engineering and technological design courses for education majors;
- Technology or engineering content coursework.

4. Completion of a minimum of 6 semester hours of required coursework in STEM curriculum and methods to include the following essential concepts and skills:

- Comparing and contrasting the nature and goals of each of the STEM disciplines;
- Promoting learning through purposeful, authentic, real-world connections;

- Integration of content and context of each of the STEM disciplines;
- Interdisciplinary/transdisciplinary approaches to teaching (including but not limited to problem-based learning and project-based learning);
- Curriculum and standards mapping;
- Engaging subject-matter experts (including but not limited to colleagues, parents, higher education faculty/students, business partners, and informal education agencies) in STEM experiences in and out of the classroom;
- Assessment of integrative learning approaches;
- Information literacy skills in STEM;
- Processes of science and scientific inquiry;
- Mathematical problem-solving models;
- Communicating to a variety of audiences;
- Classroom management in project-based classrooms;
- Instructional strategies for the inclusive classroom;
- Computational thinking;
- Mathematical and technological modeling.

5. Completion of a STEM field experience of a minimum of 30 contact hours that may be met through the following:
- Completing a STEM research experience;
- Participating in a STEM internship at a STEM business or informal education organization; or
- Leading a STEM extracurricular activity

c. Specialist/coach, K-12.

(1) Authorization. The holder of this endorsement is authorized to serve as a STEM specialist in kindergarten and grades one through twelve.

(2) Program requirements.

1. The applicant must have met the requirements for a standard Iowa teaching license and a teaching endorsement in mathematics, science, engineering, industrial technology, or agriculture.

2. The applicant must hold a master's degree from a regionally accredited institution. The master's degree must be in math, science, engineering or technology or another area with at least 12 hours of college-level science and at least 12 hours of college-level math (or completion of Calculus I) to include coursework in computer programming.

(3) Content.

1. Completion of a minimum of 3 semester hours of coursework in content or pedagogy of engineering and technological design that includes engineering design processes or programming logic and problem-solving models and that may be met through either of the following:
- Engineering and technological design courses for education majors;
- Technology or engineering content coursework.

2. Completion of 9 semester hours in professional development to include the following essential concepts and skills:
- STEM curriculum and methods:

- Comparing and contrasting the nature and goals of each of the STEM disciplines;
- Promoting learning through purposeful, authentic, real-world connections;
- Integration of content and context of each of the STEM disciplines;
- Interdisciplinary/transdisciplinary approaches to teaching (including but not limited to problem-based learning and project-based learning);
- Curriculum/standards mapping;
- Assessment of integrative learning approaches;
- Information literacy skills in STEM;
- Processes of science/scientific inquiry;
- Mathematical problem-solving models;
- Classroom management in project-based classrooms;
- Instructional strategies for the inclusive classroom;

- Computational thinking;
- Mathematical and technological modeling.

● STEM experiential learning:

- Engaging subject-matter experts (including but not limited to colleagues, parents, higher education faculty/students, business partners, and informal education agencies) in STEM experiences in and out of the classroom;
- STEM research experiences;
- STEM internship at a STEM business or informal education organization;
- STEM extracurricular activity;
- Communicating to a variety of audiences.

● Leadership in STEM:

- STEM curriculum development and assessment;
- Curriculum mapping;
- Assessment of student engagement;
- STEM across the curriculum;
- Research on best practices in STEM;
- STEM curriculum accessibility for all students.

3. Completion of an internship/externship professional experience or prior professional experience in STEM for a minimum of 90 contact hours.

ITEM 3. Adopt the following **new** paragraph **17.1(3)"c"**:

c. Engineering.

(1) Completion of a baccalaureate degree in engineering.

(2) Demonstrated career and technical competence in engineering by completion of a minimum of 4,000 hours of practical, hands-on experience in engineering.

(3) Coursework in foundations of career and technical education, planning and implementing courses and curriculum, methods and strategies of STEM instruction, and assessment of STEM programs and students.